Building up Professional Knowledge for Fostering Students' Argumentation in the Mathematics Classroom – a Vignette-based Approach

Jens Krummenauer[1], Sebastian Kuntze[1], Ceneida Fernández[3], Marita Friesen[2], Lulu Healy[4], Pedro Ivars[3], Salvador Llinares[3], Libuše Samková[5] & Karen Skilling[6]

[1]Ludwigsburg University of Education, [2]Freiburg University of Education, [3]University of Alicante, [4]King's College London, [5]University of South Bohemia in České Budějovice, [6]University of Oxford

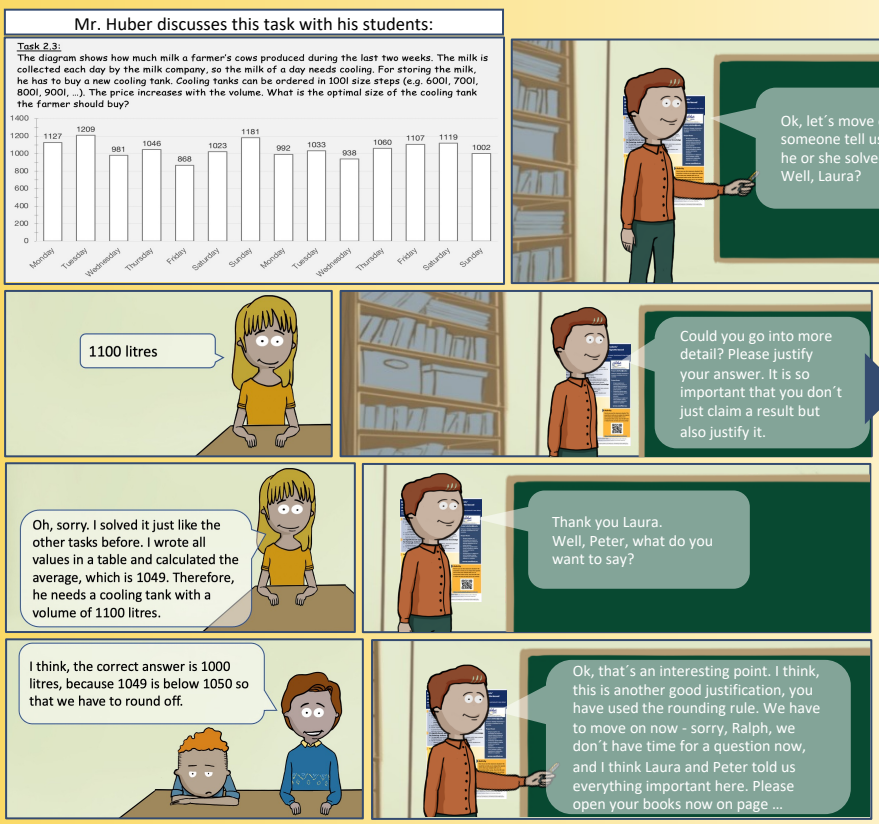
Theoretical Background

- Fostering students' argumentation is a central aim of the mathematics classroom.
- Empirical studies imply that teachers often lack of professional knowledge on how to foster students' argumentation (e.g. Stylianides et al., 2016; Krummenauer & Kuntze, 2021, submitted), such as
  - an **awareness of possible learning opportunities** which allow to foster students' argumentation.
  - **knowledge on common difficulties of students** in requirement contexts related to argumentation, which may enable teachers to foster students.
- Such knowledge should thus be built up in university teacher education.
- For this, vignettes – understood as representations of profession-related requirement contexts (cf. Kuntze & Buchbinder, 2018) – show a high potential, as they allow student teachers to reflect on particular profession-related contexts and to connect them with relevant theory elements.

A vignette-based approach for building up professional knowledge for fostering students' argumentation

- The **core idea:** using vignettes to facilitate access to classroom situations, which have a potential of fostering students' argumentation, for pre-service and in-service teachers' analysis.
- The set of vignettes included in the intervention focus on **two core aspects**:
  - encouraging reflection on interaction and argumentation processes in the classroom and their role for students' learning and
  - encouraging reflection on helping students to further develop their argumentation.

Sample Vignette



How does the teachers' interaction with the students support their learning? Please evaluate the interaction and argumentation processes in this classroom situation and give reasons for your observations.

Project coReflect@maths

Digital Support for Teachers' Collaborative Reflection on Mathematics Classroom Situations

Erasmus+ Strategic Partnership of six partner universities from four countries

Project Goals

- Bringing together and exchanging the practice of vignette-based professional learning established by the project partners
- Developing vignette-based course concepts for student teachers and teacher educators
- Development of a digital tool which facilitates creating vignettes and collaborative reflection on vignettes

www.coreflect.eu

Activity

How do you see this classroom situation? We would like to invite you to analyse this vignette and to share your analysis with us in an anonymised online survey. Scan the QR-code or follow the link and take part in the activity!

https://ww3.unipark.de/uc/coreflect4/

References

Buchbinder, O., & Kuntze, S. (Eds.). (2018). *Mathematics Teachers Engaging with Representations of Practice. A Dynamically Evolving Field*. Cham, Switzerland: Springer.

Krummenauer, J., & Kuntze, S. (2021). Primary school teachers' awareness of learning opportunities related to statistical variation. In C. Andrà, D. Brunetto & F. Martignone (Eds.), *Theorizing and Measuring Affect in Mathematics Teaching and Learning* (pp. 147–157). Cham, Schweiz: Springer.

Stylianides, A. J., Bieada, K. N., & Morselli, F. (2016). Proof and argumentation in mathematics education. In A. Gutiérrez, G. C. Leder & P. Boero (Eds.), *The Second Handbook of Research on the Psychology of Mathematics Education. The Journey Continues* (pp. 315-351). Rotterdam: Sense Publishers.

Erasmus+

The project coReflect@maths (2019-1-DE01-KA203-004947) is co-funded by the Erasmus+ Programme of the European Union. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.